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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,739	02/07/2006	Esther Breuning	14113-00033-US	5924
23416 7590 03/15/2010 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899				
EXAMINER				
WILSON, MICHAEL H				
ART UNIT		PAPER NUMBER		
1794				
MAIL DATE		DELIVERY MODE		
03/15/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/561,739

**Applicant(s)**

BREUNING ET AL.

**Examiner**

MICHAEL WILSON

**Art Unit**

1794

**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2-14, 17-29 and 32-39 is/are pending in the application.
- 4a) Of the above claim(s) 5-7, 17-21, 25-29, 32, 33, 35-37, and 39 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2-4, 8-14, 22-24, 34 and 38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-940)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office action is in response to Applicant's amendment filed 16 November 2009, which amends claims 3.

Claims 2-14, 17-29, and 32-39 are pending.

2. Claims 5-7, 17-21, 25-29, 32, 33, 35-37, and 39 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 29 October, 2008.

3. The rejection under 35 U.S.C. 102(e) of claims 2-4, 8, 11-13, and 22-24 as being anticipated by Roberts et al. (US 200/0062930 A1), is overcome due to Applicant's amending of the claims in the reply filed 16 November 2009.

4. The rejection(s) under 35 U.S.C. 103(a) of claims 3, 4, and 10 as being unpatentable over Sohn et al. (US 2002/0093005 A1 ) in view of Thompson et al. (US 2003/0017361 A1) is overcome due to applicant's amending of the claims in the reply filed 16 November 2009.

### ***Claim Objections***

5. Claim 3 is objected to because of the following informalities:

Regarding claim 3, on page 3 line 4 under the definition of R "the aromatic *units* is optionally part" should read --the aromatic unit is optionally part-- or --the aromatic units are optionally part--.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 2-4, 8-14, 22-24, and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 3 recites the limitation "POLY1" in page 5. There is insufficient antecedent basis for this limitation in the claim.

Regarding claims 3, 9, and 10, R in instant formula (I) is limited to an alkylene, a vinyl, an acetylene, an aromatic or a heteroaromatic system in claim 3, however at the end of claims 3, 9, and 10 these claims recite regarding R "or a combination of these systems." A combination of multiple systems in R does not appear to be within the scope of R previously defined in claim 3, rendering the claims indefinite.

Further regarding claim 3, it is unclear how the aromatic unit can be a part of a larger fused system when the aromatic ring system is selected from the "group consisting of."

Additionally regarding claim 10, the claim states that formula (I) is incorporated into the polymer via the bridge R when R is an aryl, heteroaryl, stilbenyl, or tolanyl unit. However this is outside the scope of claim 3 which states that formula (I) is incorporated into the polymer via the 3,6-positions, 2,7-positions, 3,3'-positions, or 2,2' positions when R is an aryl or heteroaryl (stilbenyl and tolanyl systems are listed as aromatic ring systems in claim 3).

Regarding claim 34, instant formulae (XII)-(XIV), (XVIII)-(XXV), and (XXXIII)-(XXXV) are not within the scope of instant formula (I) as defined in claim 3 rendering the claim indefinite.

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 2-4, 8, 10-14, 22-24, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) in view of Hu et al. (US 6,670,054 B1).

Regarding claims 2, 3, 8, 10, 14, and 34, Roberts et al. disclose a mixture (blend) comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087], structure XCII), and a triplet emitter [0161]. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1\*75) or less of at least one bridged carbazole unit, wherein instant R is a combination of two aromatic ring systems (benzene), and 0.05-10% by weight of at least one triplet emitter [0163]. The reference discloses wherein a bicarbazole unit is incorporated into the polymer via the 2, 7-position ([0086]-[0087], structure XCII). However the reference does not explicitly disclose bicarbazole units with bridging groups which are not two benzene groups.

Hu et al. teach bicarbazole compounds for use in electroluminescent devices (abstract). The reference teaches that the linking groups between the carbazoles may be one of several different aryl and heteroaryl groups including phenyl, biphenyl, triphenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene and thiophene (column 4, line 59 to column 5, line 60). The reference recognized the equivalency of the groups by teaching them together as suitable linking units.

In view of Hu et al.'s recognition that biphenyl, phenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene and thiophene are equivalent and interchangeable, it would have been

obvious to one of ordinary skill in the art to substitute biphenyl with phenyl, 9,10-anthracene, stilbenyl, 2,6-naphthylene or thiophene and thereby arrive at the present invention. Case law holds that the mere substitution of an equivalent (something equal in value or meaning, as taught by analogous prior art) is not an act of invention; where equivalency is known to the prior art, the substitution of one equivalent for another is not patentable. See *In re Ruff* 118 USPQ 343 (CCPA 1958). Additionally because Roberts et al. discloses that a bicarbazole with a biphenyl linker as suitable for the polymer of Roberts et al. et al. one of ordinary skill in the art would reasonably expect other monomeric equivalents of bicarbazole with a biphenyl linker to also be suitable.

Regarding claim 4, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of a conjugated polymer, which contains 7.5% (0.1\*75) or less of a bridged carbazole unit of instant formula (I) ([0086]-[0087]), and 0.05-10% by weight of at least one triplet emitter [0163].

Regarding claim 10, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally claim 10 only recites that when R and R<sup>1</sup> are an aryl or heteroaryl the compound is bound to the polymer via R<sup>1</sup>, whoever the claim does not require an R<sup>1</sup> to be present (i.e. n may still be 0). Therefore all the claim limitations are met as set forth above.

Regarding claim 11, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural

elements of the polymer are selected from the groups meta- or para-phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]).

Regarding claim 12, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements which improve charge transport ([0085]-[0086]).

Regarding claim 13, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements are selected from the groups of the triarylaminines ([0087] structures XCIII to XCVI) or the oxadiazolylenes ([0073] structures LV to LVII, LIX, LXII, and LXIV to LXVII).

Regarding claim 22, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein any further molecules, which may be low molecular weight, oligomeric, or polymeric, may also be added to the mixture [0163].

Regarding claim 23, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein a compound of instant formula (II) is added to the mixture ([0391], CBP = bicarbazole-biphenyl).

Regarding claim 24, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the total bicarbazole content is within the claimed range [0163]. The total content based on combining the weight of bicarbazole polymer units and the weight of CBP is approximately 57% by weight or less [0163].



11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) in view of Hu et al. (US 6,670,054 B1) as applied to claim 4 above and further in view of Maxted et al. (WO 03/074628 A).

Regarding claim 9, modified Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7 -position ([0086]-[0087]). However the reference does not disclose the bicarbazole unit bound via the 3, 3'-position.

Maxted et al. teach a similar charge transporting polymer comprising a bicarbazole unit (page 9, compound KLCBP1). The reference teaches the bicarbazole may be bound via the 3, 3'-position.

It would be obvious to one of ordinary skill in the art at the time of the invention to connect the bicarbazole unit of Roberts via the 3, 3'-position, as taught by Maxted et al., in the polymer of Roberts et al. One of ordinary skill would reasonably expect such a polymer to have similar properties and be suitable for the same purpose given that Maxted et al. 3, 3'-bound bicarbazole units as suitable for charge transfer polymers (page 9, first full paragraph), suitable for use in electroluminescent devices (abstract). One of ordinary skill would be motivated by a desire to optimize the physical properties of the polymer as the specific connectivity of a polymer is known to directly affect the physical properties of the material.

12. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) in view of Treacher et al. (WO 02/077060 A) English equivalent (US 2004/0135131 A1) relied upon.

Regarding claim 38, Roberts et al. disclose a mixture (blend) comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087]), and a triplet emitter [0161]. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1\*75) or less of at least one bridged carbazole unit, wherein instant R is an aromatic ring system (biphenyl), and 0.05-10% by weight of at least one triplet emitter [0163]. Additionally, the reference discloses wherein further structural elements of the polymer are selected from the groups meta- or para-phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]). However the reference does not explicitly disclose spirobifluorene as a suitable copolymer unit.

Treacher et al. teach conjugated polymers for use in organic electroluminescent devices (abstract). The reference teaches fluorene and spirobifluorene copolymers as suitable for polymers used in charge transporting or luminescent layers ([0134]-[0135]). The reference teaches that using both fluorene and spirobifluorene units in a polymer results in higher luminous efficiency, greater brightness as the same energy consumption, and a longer operating life ([0034]-[0037]).

It would be obvious to one of ordinary skill in the art at the time of the invention to use the fluorene and spirobifluorene copolymer units of Treacher et al. in the polymer of

Roberts et al. One of ordinary skill in the art would reasonably expect such a combination to be suitable given that Treacher teaches both units as suitable for polymers in organic electroluminescent devices and that Roberts et al discloses fluorene as suitable. One of ordinary skill would be motivated by a desire to have higher luminous efficiency, greater brightness as the same energy consumption, and a longer operating life.

### ***Response to Arguments***

13. Applicant's arguments filed 16 November 2009 have been fully considered but they are not persuasive.

Applicants argue regarding Roberts et al. (US 200/0062930 A1) in view of Hu et al. (US 6,670,054 B1) that not all linking groups are equivalent, even if they are mentioned together. Applicants assert that Hu et al. teaches on columns 11-16 that dicarbazoles having a biphenyl group as the linking group are the most preferred embodiment and that there is no reason to selectively choose a group different from biphenyl as the linking group let alone the applicant's claimed "R" group. However the presence of a preferred embodiment does not negate a finding of obviousness under 35 USC 103 since a preferred embodiment such as an example is not controlling. Rather, all disclosures "including unpreferred embodiments" must be considered. *In re Lamberti* 192 USPQ 278, 280 (CCPA 1976) citing *In re Mills* 176 USPQ 196 (CCPA 1972). Hu et al. clearly teaches other linking groups in columns 9-11, several of which overlap with the presently claimed groups. Patented claim 6 of Hu et al. also clearly demonstrates

other linking groups in addition to biphenyl may be used as linking groups. The reference taken as a whole clearly does not teach away from using other aryl or heteroaryl groups as linking groups between two carbazoles. Further equivalent and interchangeable does not mean identical, but that the groups are similar, any change to a compound will alter the compounds properties. Replacing a group with another that is equivalent and interchangeable will give a compound one of ordinary skill in the art could reasonably expect to have similar properties and be suitable for the same purpose. The specific properties may be slightly different from the original compound but the overall property would remain the same. For example a hole transporting compound may have slightly more or less hole mobility when equivalent groups are interchanged, but the compound would still remain hole transporting.

Applicants also argue that the statement that modifications of the prior art to meet the claimed invention would have been "obvious to one of ordinary skill in the art at the time the invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teachings of the references. However the examiner notes that both motivation to combine and the reasons one of ordinary skill in the art would reasonably expect success have previously been articulated in the rejections of record. Therefore the rejections do not merely make the conclusory statement, but articulate reasoning with rational underpinning to support the conclusion of obviousness. However the examiner notes that both motivation to combine and the reasons one of ordinary skill in the art

would reasonably expect success have previously been articulated in the rejections of record. Therefore the rejections do not merely make the conclusory statement, but articulate reasoning with rational underpinning to support the conclusion of obviousness.

Additionally applicants also argue that the Examiner cannot selectively pick and choose from the disclosed parameters without proper motivation as to a particular selection; and asserts that the mere fact that a reference may be modified to reflect features of the claimed invention does not make the modification, and hence the claimed invention obvious unless the prior art suggested the desirability of such modification. Thus, applicants argue that that the examiner used impermissible hindsight reasoning. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The rejections of record only use knowledge which was within the level of ordinary skill at the time the claimed invention was made with motivation to combine coming explicitly or implicitly from the cited references and not from applicant's specification. Therefore the rejections of record are not based on impermissible hindsight reasoning.

***Miscellaneous***

14. The status modified for claim 39 "previously presented" is incorrect. The correct status of claim 39 is --withdrawn--.

***Conclusion***

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

17. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 1794

MHW

